IL36RN gene

interleukin 36 receptor antagonist

Normal Function

The *IL36RN* gene provides instructions for making a protein called interleukin 36 receptor antagonist (IL-36Ra). This protein is primarily found in the skin where it helps regulate inflammation, part of the body's early immune response. Inflammation in the skin is stimulated when other proteins called IL-36 alpha (α), IL-36 beta (β), or IL-36 gamma (γ) attach to (bind) a specific receptor protein. This binding turns on (activates) signaling pathways that promote inflammation, namely the NF-κB and MAPK pathways. To control inflammatory reactions, the IL-36Ra protein binds to the receptor protein so that IL-36α, IL-36β, and IL-36γ cannot. In this way, the IL-36Ra protein blocks (antagonizes) the receptor's activity.

Health Conditions Related to Genetic Changes

generalized pustular psoriasis

More than a dozen *IL36RN* gene mutations have been found to increase susceptibility to a serious skin disorder called generalized pustular psoriasis (GPP). Individuals with this condition have repeated episodes in which large areas of skin become red and inflamed and develop small pus-filled blisters (pustules). The skin problems can be accompanied by fever and other signs of inflammation throughout the body (systemic inflammation). The episodes are thought to be triggered by infections, certain medications, menstruation, pregnancy, or other stresses on the body.

The *IL36RN* gene mutations associated with GPP reduce the amount of IL-36Ra protein in the skin or eliminate it altogether. Without control by IL-36Ra, signaling pathways that promote inflammation are overly active, resulting in uncontrolled inflammation, particularly in the skin.

IL36RN gene mutations increase the risk of developing GPP. Not everyone with mutations in this gene has the characteristic problems with inflammation. This complex condition is thought to arise from a combination of genetic and environmental factors.

other disorders

IL36RN gene mutations are also associated with other inflammatory skin conditions that involve pustule formation. Like GPP (described above), acute generalized

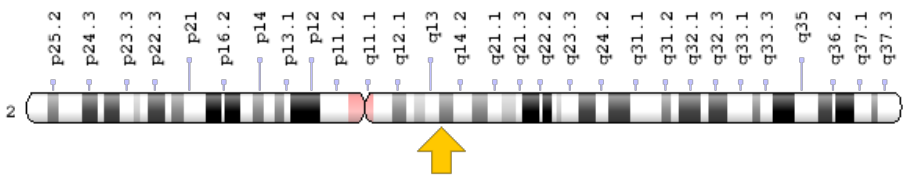
exanthematous pustulosis (AGEP), is characterized by a rash and pustules over a large area of the body, typically triggered by antibiotics or other medications. (Certain features of the inflamed skin differentiate AGEP and GPP.) Other *IL36RN*-associated conditions are classified as forms of localized pustular psoriasis because the blisters are found in limited regions of the body. For example, palmoplantar pustulosis affects the hands and feet, and acrodermatitis continua of Hallopeau affects the tips of the fingers and toes. It is unclear how mutations in the same gene cause these different conditions.

IL36RN gene mutations have been found in individuals with a condition called geographic tongue, in which the top and sides of the tongue have irregular patches that resemble a map. The patches are not linked to infections or other health problems. Some people with GPP have geographic tongue, but the abnormality can also occur without features of other conditions.

Chromosomal Location

Cytogenetic Location: 2q14.1, which is the long (q) arm of chromosome 2 at position 14.1

Molecular Location: base pairs 113,058,638 to 113,064,744 on chromosome 2 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- FIL1
- FIL1(DELTA)
- FIL1D
- IL-1 related protein 3
- IL-1F5
- IL-36Ra
- IL1F5
- IL1HY1

- IL1L1
- IL1RP3
- IL36RA
- interleukin 1 family, member 5 (delta)
- interleukin-1 HY1
- interleukin-1-like protein 1
- interleukin-1 receptor antagonist homolog 1
- interleukin-36 receptor antagonist protein
- MGC29840
- PSORP
- PSORS14

Additional Information & Resources

Educational Resources

- Boston University: NF-κB Transcription Factors
  http://www.bu.edu/nf-kb/

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28IL36RN%5BTIAB%5D%29+OR+%28interleukin+36+receptor+antagonist%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D

OMIM

- INTERLEUKIN 36 RECEPTOR ANTAGONIST
  http://omim.org/entry/605507

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_IL36RN.html
- ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=IL36RN%5Bgene%5D
- HGNC Gene Family: Interleukins
  http://www.genenames.org/cgi-bin/genefamilies/set/601

- HGNC Gene Symbol Report
  http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=15561
- NCBI Gene
  https://www.ncbi.nlm.nih.gov/gene/26525
- UniProt
  http://www.uniprot.org/uniprot/Q9UBH0

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